UNITED STATES PATENT AND TRADEMARK OFFICE

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EXAMINER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

<table>
<tr><td rowspan="2" style="vertical-align:middle">Office Action Summary</td><td>Application No.
10/767,399</td><td>Applicant(s)
DALAL ET AL.</td></tr>
<tr><td>Examiner
MICHAEL C. KROFCHECK</td><td>Art Unit
2186</td></tr>
</table>

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _14 November 2008_.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1,2,4-14 and 16-24_ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1,2,4-14 and 16-24_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _29 January 2004_ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

1.   This office action is in response to amendment filed on 11/14/2008.

2.   The objections and rejections from the prior correspondence that are not restated

herein are withdrawn.

Claim Rejections - 35 USC § 103

3.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented
> and the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

4.   The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1.   Determining the scope and contents of the prior art.
2.   Ascertaining the differences between the prior art and the claims at issue.
3.   Resolving the level of ordinary skill in the pertinent art.
4.   Considering objective evidence present in the application indicating obviousness or nonobviousness.

5.   Claims 1-2, 4-14, 16-24 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Bridge (6405284), Vishlitzky et al. (5819310), and Soejima et al.,

(2003/0074528).

6.   With respect to claim 1 and 13, Bridge teaches of a medium for storing computer executable instructions, wherein a method is performed in response to executing the instructions (column 26, line 55-column 27, line 44); the method comprising: in response to a request to perform a plurality of operations on a plurality of volumes, identifying a first storage region of a plurality of storage regions available for allocation for a first operation of the plurality of operations on a first volume of the plurality of volumes (fig. 11, item 1102; column 1, lines 35-51; column 19; lines 24-61);

Bridge fails to explicitly teach of a plurality of logical volumes. However, Vishlitzky teaches of a mirrored set, mirroring data from one logical volume to another (fig. 1; column 6, lines 25-40; thus multiple logical volumes).

The combination of Bridge and Vishlitzky teaches of determining whether each of the remaining operations of the plurality of operations can be performed on the remaining volumes of the plurality of logical volumes using one or more subsets of the plurality of storage regions, wherein the one or more subsets exclude the identified first storage region (Bridge, fig. 11, items 1106; column 1, lines 35-51; column 19; lines 24-61), and

The combination of Bridge and Vishlitzky also teaches of allocating the first storage region for the first operation (Bridge, fig. 11; column 19, lines 24-45).

The combination of Bridge and Vishlitzky fails to explicitly teach of allocating the first storage region for the first operation after performing said identifying and said determining, if said determining determines that each of the remaining operations can be performed.

However, Soejima teaches of allocating the first storage region for the first operation after performing said identifying and said determining, if said determining determines that each of the remaining requirements can be satisfied (fig. 4; paragraph 43-44).

It would have been obvious to one of ordinary skill in the art having the teachings of Bridge and Vishlitzky at the time of the invention to include locating the full mirrored partners on different logical volumes from each other. Their motivation would have been to facilitate reading operations from a mirrored pair of drives (Vishlitzky, column 4, lines 39-41).

It would have been obvious to one of ordinary skill in the art having the teachings of Bridge, Vishlitzky, and Soejima at the time of the invention to determine if requirements for full mirror partners to a primary extent are satisfied before allocating the primary extent in the combination of Bridge and Vishlitzky as suggested in Soejima. Their motivation would have been to streamline the allocation process, increasing efficiency and performance (Soejima, paragraph 15-16).

7.   With respect to claim 2 and 14, the combination of Bridge, Vishlitzky, and Soejima teaches of if said determining determines that each of the remaining operations cannot be performed using the one or more subsets of the plurality of storage regions, identifying a third storage region of the plurality of storage regions available for allocation for the first operation (Bridge, fig. 11; column 1, lines 35-51; column 19; lines 24-61; as when a sufficient mirror partner cannot be found, the primary extent is deallocated and a new primary parity extent is selected at 1102 again), and

determining whether each of the remaining operation of the plurality of operations can be performed using a one or more subsets of the plurality of storage regions, wherein the one or more subsets exclude the third storage region and include the first storage region (fig. 11, items 1106; column 1, lines 35-51; column 19; lines 24-61).

8.   With respect to claim 4 and 16, the combination of Bridge, Vishlitzky, and Soejima teaches of identifying a respective set of rules to configure each respective logical volume of the plurality of logical volumes prior to identifying the first storage region, wherein the respective set of rules for each respective logical volume is used to identify a respective storage region to allocate for the respective logical volume (Bridge, fig. 11; column 19, lines 40-44; the round robin algorithm is used to distribute the location of the extents across the disk drives).

9.   With respect to claim 5 and 17, the combination of Bridge, Vishlitzky, and Soejima teaches of wherein the determining whether each of the remaining operations can be performed comprises examining a second respective set of rules for a second logical volume of the plurality of logical volumes (Bridge, fig. 11; column 19, lines 45-54; the other extents must be located in only the full mirror partners).

10.   With respect to claim 6 and 18, Bridge teaches of determining a respective storage region to allocate for each respective operation of the set of operations by determining whether a remaining operation of the set of operations can be performed using an unallocated subset of the plurality of storage regions, wherein the remaining operation excludes the respective operation, the unallocated subset excludes the respective storage region, and the unallocated subset excludes an allocated subset of

the plurality of storage regions wherein each storage region in the allocated subset is allocated to one of the set of operations (fig. 11; column 19, lines 24-61).

11.   With respect to claim 7 and 19, Bridge teaches of wherein each operation of the set of operations is one type of operation (fig. 11; column 19; lines 24-61; the first operation is a parity extent allocation; the second operation is a data extent allocation, the third operation is a store of management information).

12.   With respect to claim 8 and 20, Bridge teaches of wherein a first operation of the set of operations is a first type of operation (fig. 11; column 19; lines 24-61; the first operation is a parity extent allocation),

a second operation of the set of operations is a second type of operation (fig. 11; column 19; lines 24-61; the second operation is a data extent allocation), and

the first type and the second type are different (fig. 11; column 19; lines 24-61; the parity extent allocation is different from the data extent allocation as there are different requirements that must be fulfilled. Additionally, the store of management information can also be interpreted as a second operation).

13.   With respect to claim 9 and 21, Bridge teaches of wherein the first storage region conforms to a first intent of the first logical volume (fig. 11; column 19, lines 24-27, lines 40-44; the location for the parity extent is selected based on the round robin algorithm. Doesn't any storage region that is a logical volume conform to the intent of that logical volume. It must satisfy the requirements of the logical volume to be allocated as the logical volume).

14.   With respect to claim 10 and 22, Bridge teaches of wherein the first intent comprises a first rule used to configure the first storage region to provide the first logical volume (fig. 11; column 19, lines 24-27, lines 40-44; the round robin algorithm (first rule) is used to select the storage location for the parity extent).

15.   With respect to claim 11 and 23, Bridge teaches of performing the first operation on the first logical volume using the first storage region (fig. 11, items 1102, 1104; column 1, lines 35-51; column 19; lines 24-61).

16.   With respect to claim 12 and 24, Bridge teaches of wherein one operation of the set of operations is one of the following: creating the first logical volume; growing a second logical volume of the plurality of logical volumes; and adding a mirror to a third logical volume of the plurality of logical volumes (fig. 8, 9, 10a, 19, items 802-804, 910, 1004 respectively; column 16, lines 33-47; column 17, lines 27-34; column 17, lines 62-66; column 26, lines 57-65).

Response to Arguments

17.   Applicant's arguments filed 11/14/2008 have been fully considered but they are not persuasive.

18.   In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., that the claimed allocating *only* occurs if the determining limitation determines that each of the remaining operations can be performed (applicant's remarks 7/14/2008 bottom of page 9 and remarks 11/14/2008pages 10-11)) are not recited in the rejected

claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

a.   The language of claim 1 recites, "...allocating the first storage region for the first operation, after performing said identifying and said determining, if said determining determines that each of the remaining operation can be performed." Nowhere within this language or any other language in the independent claims is a limitation that positively recites that the allocation exclusively happens if said determining determines each of the remaining operations can be performed. The claim states, "allocating...if said determining determines that each of the remaining operations can be performed." Thus it recites one instance where allocation occurs and makes no other restriction about when that allocating can or can not occur. Restricting the claim interpretation to *only* when "said determination..." (an indication of when it can occur and when it cannot occur) would be improperly further narrowing of the scope of the claims (MPEP 2111).

b.   Furthermore, as explained in the prior correspondence on 8/15/2008 and in the rejection of independent claims 1 and 13 under 35 USC 103(a) in view of Bridge, Vishlitzky, and Soejima, Soejima discloses the concept in question in figure 4 and paragraphs 43-44 where if the specified storage capacity and the desired access times (desired remaining requirements) satisfy the requirements, the volume is created. Furthermore Soejima does not recite creation of the volume when the required access times are not satisfied.

19.   The applicant also argues that Bridge and Vishlitzky do not teach of, "using one

or more subsets of the plurality of storage regions," in the claimed determining step

because Bridge only makes the determination based on if there are enough full mirror

partners, which is unrelated to subsets. The examiner disagrees.

       c.   A subset as defined in paragraph 17 of this application's specification is,

       "a set of entities [that] may include only one, some but not all, or all of the entities

       in the set." Thus a subset may include one, some, or all of the storage regions.

       The storage regions of Bridge are the disk drives, where in column 19, lines 40-

       42 a disk drive is selected for the primary extent of the parity extent set. Figure

       6-7 and column 14, lines 7-63 of Bridge show and describe how the disks act as

       full mirror partners, with different disks (subsets) being mirror partners with

       different disks. When selecting the disk drives to allocate the remaining extents,

       the mirror partners of the initial disk drive are evaluated (a portion of the original

       disk drives, thus 'one or more subsets) to determine if they have sufficient space.

       Thus it is clear that the determining is done using the mirror partners of the

       selected disk drive which are each a subset of the initial storage regions.

20.   In response to applicant's argument that incorporating Soejima into Bridge would

allegedly render Bridge inoperative, the test for obviousness is not whether the features

of a secondary reference may be bodily incorporated into the structure of the primary

reference; nor is it that the claimed invention must be expressly suggested in any one or

all of the references. Rather, the test is what the combined teachings of the references

would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d

413, 208 USPQ 871 (CCPA 1981).

Applicant's argument with respect to the independent claims that it in not

permissible to combine Bridge with Soejima in the combination of Bridge, Vishlitzky, and

Soejima, as it would allegedly render Bridge inoperative and that Bridge and Soejima

are nonanalogous arts. The examiner disagrees with this reasoning for the following

reasons:

      d.   The invention of Bridge is directed towards, "improved load balancing,

reduction or elimination of fragmentation, and efficient incremental addition of

disk drives," (column 3, lines 10-15).   By changing the order of steps of the

allocation of Bridge (fig. 11) to reflect Soejima's allocating the first storage region

for the first operation after identifying a storage region and determining that each

of the remaining requirements can be satisfied (fig. 4; paragraph 43-44), the

improved load balancing, reduction or elimination of fragmentation, and efficient

incremental addition of disk drives as intended by Bridge would still occur.

Furthermore, as evidenced by Soejima paragraph 15-16, this would occur in a far

more efficient manner, boosting the performance of the combination.

      e.   Furthermore the applicant has not submitted any evidence indicating that

it would be impossible for Bridge to operate in the manner suggested by the

combination of Bridge, Vishlitzky, and Soejima. As stated in MPEP 716.01(c) I

and II, "Objective evidence which must be factually supported by an appropriate

affidavit or declaration to be of probative value includes...inoperability of the prior

art... The arguments of counsel cannot take the place of evidence in the record."

21.   In response to applicant's argument that Bridge and Soejima are nonanalogous

art, it has been held that a prior art reference must either be in the field of applicant's

endeavor or, if not, then be reasonably pertinent to the particular problem with which the

applicant was concerned, in order to be relied upon as a basis for rejection of the

claimed invention.   See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir.

1992).

In this case, the invention of Bridge is directed to the field of "managing storage

systems containing multiple data storage devices," Bridge column 1, lines 6-10.

Specifically including the allocation of extents. Soejima's invention is also in the field of

storage volume management, specifically, "a volume management method for defining

a volume on a physical storage device of a storage apparatus," Soejima paragraph 1.

Soejima goes on to teach of ensuring the requested access times of operations of all

previous volumes are satisfied before creating an additional volume (fig. 4; paragraph

44). The applicant's invention is directed to, "a method, system, computer system, and

computer program product to allocate storage resources among multiple logical

volumes," (paragraph 6).

22.   In response to applicant's arguments against the references individually, one

cannot show nonobviousness by attacking references individually where the rejections

are based on combinations of references.   See *In re Keller*, 642 F.2d 413, 208

USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir.
1986).

23.   In response to applicant's argument that the references (Soejima) fail to show
certain features of applicant's invention, it is noted that the features upon which
applicant relies (i.e., "performing a plurality of operation at a time," remarks 11/14/2008,
page 16) are not recited in the rejected claim(s). Although the claims are interpreted in
light of the specification, limitations from the specification are not read into the claims.
See *In re Van Geuns,* 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

24.   Additionally, the applicant argues that Soejima does not teach of the claimed
"determining" from claims 1 and 13. As already established in the rejection with regards
to claims 1 and 13 and in the arguments above, Bridge teaches of the determining
operation as described above.

25.   Additionally, the applicant argues that Soejima does not teach of the claimed
"request to perform a plurality of operations on a plurality of logical volumes" from
claims 1 and 13. As already established in the rejection with regards to claims 1 and 13
above, Bridge teaches of this limitation in fig. 11; column 1, lines 35-51; column 19;
lines 24-61.

Conclusion

26.   **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded
of the extension of time policy as set forth in 37 CFR 1.136(a).

27.   A shortened statutory period for reply to this final action is set to expire THREE
MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

28.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Krofcheck whose telephone number is 571-272-8193. The examiner can normally be reached on Monday - Friday.

29.   If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matt Kim can be reached on 571-272-4182. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

30.   Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/MICHAEL C KROFCHECK/   /Pierre-Michel Bataille/
Examiner, Art Unit 2186   Primary Examiner, Art Unit 2186
Michael Krofcheck